Abstract

An adaptive equalizer system and method uses an averaging algorithm to adjust equalization and amplitude control over an incoming data signal. The equalizer system couples the equalized signal through a sampling logic block to obtain two sample data points from the equalized signal, spanning a sampling window. Equalization control is accomplished by analyzing the sampled data points with a state machine that uses a counter to determine when a signal condition has persisted long enough to require equalization adjustment. Amplitude control is accomplished similarly with a state machine that analyzes the sampled data points for persistent conditions in the amplitude of the received data signal. A programmable peak detector is used to adjust the amplitude of the received signal. By monitoring persistent conditions in the equalized signal, the average signal received by the equalizer is properly compensated. The bit resolution of the equalizer control and the amplitude control can be increased as is necessary for a given resolution in a system. Since the equalization system uses the incoming data signal to generate the requisite timing signals for sampling and control, high frequency clock circuits and phase locked loop techniques are unnecessary resulting in lower power consumption and reduced costs. The equalizer settings from the analyzed incoming data signal may be applied to other equalizers that receive other data signals such that the equalizers share common control signals. The equalizer settings may be adjusted during an initialization cycle, periodically adjusted over time, or continuously adjusted as may be desired.